

Claims

- 1) Plant for the melting of primary and secondary aluminium, with screening and recovery of the slags, characterized in that it uses: a rotating furnace, internally equipped with a spiral element (11), that realizes the fusion of the aluminium not using
5 a salty bath; a channel of pouring (13), realized with a suitable inclination and adequately contained in an insulated box (14) and equipped with a window (15) that is placed among the hole (4) of the rotating furnace and the spherical storage basin (16) positioned on a lower plan, in a pit, and equipped with a rotating joint (17) that realizes a continuity of inclination with the channel of pouring (13) so that to obtain the direct
10 and continuous pouring of the fused metal in the tank; an automatic and continuous apparatus of selection and recovery of the slag of fusion directly integrated in the same plant; a double canalization of the exhaust gases.
- 2) Plant for the melting of primary and secondary aluminium, with screening and recovery of the slags, as claimed in claim 1, characterized in that the furnace for the
15 fusion of primary and secondary aluminium (scraps), is constituted by a hollow cylindrical body (1), with circular section, whose inside diameter constantly varies along its longitudinal axle to originate a negative inclination on the horizontal line, beginning from the extremity where it is the loading porthole (2) up to the extremity where is positioned the hole (4), with plain slot, for the leakage of the fused metal.
- 20 3) Plant for the melting of primary and secondary aluminium, with screening and recovery of the slags , as claimed in claims 1 and 2, characterized in that the favourite negative inclination on the horizontal line of the furnace is two centimetres for linear meter of the length of the furnace.
- 25 4) Plant for the melting of primary and secondary aluminium and with screening and recovery of the slags , as claimed in claim 1, characterized in that the furnace is kept in

horizontal position by metallic traverse frames (5) that place and creep on the slides (6) held on metallic supports (7); on both the left and right extremities of the body (1) are the openings (8) and (9) for the escaping of the exhaust gases that flow in a single channel of evacuation (10).

5 5) Plant for the melting of primary and secondary aluminium, with screening and recovery of the slags , as claimed in claims 1, 2 and 4, characterized in that on the surface of the inside wall of the body (1) and along all its length, it is a spiral element (11), whose spires, cylindrical with circular section, with constant diameter and built in refractory material resistant against the heat and the mechanical stress due to the action
10 of the scrap in fusion, have in the low part of the cylinder (1), close to the wall, a multiplicity of galleries or channels (12) with a favourite semicircular section.

6) Plant for the melting of primary and secondary aluminium and with screening and recovery of the slag , as claimed in claims 1 and 4, characterized in that the spires of the element (11) have an elliptical or polygonal section.

15 7) Plant for the melting of primary and secondary aluminium, with screening and recovery of the slags , as claimed in claims 1 and 5, characterized in that the galleries or channels (12) have whatever section, e.g. circular, elliptical or polygonal.

8) Plant for the melting of primary and secondary aluminium, with screening and recovery of the slags , as claimed in claim 1, characterized in that the rotating module
20 of selection is constituted by three metallic hollow and coaxial cylinders, one inserted in the other, and open to the left end; the cylinders (24) and (25) have the surface side equipped with holes, greater on the first cylinder (24) and smaller on the second (25), so that in the first cylinder (24), with smaller diameter, the slag is constituted by material that has few or not put through the process of fusion, in the second cylinder

(25) it is the slag constituted by aluminium oxide, while in the third cylinder (26) they are essentially the dusts.

9) Plant for the melting of primary and secondary aluminium, with screening and recovery of the slags, as claimed in claims 1 and 8, characterized in that the selected
5 slag flows out of the extremities of the cylinders pushed by cochlea and falls in the channels (27), (28), (29) positioned everyone below a cylinder and, by a cochlea system present in every channel, are pushed, at almost ambient temperature, in the store buckets.

10) Plant for the melting of primary and secondary aluminium with screening and
10 recovery of the slags, as claimed in claims 1, 8 and 9, characterized in that the module of selection and recovery of the slag is constituted by units, placeables on tracks (31), so that it can be open for inspections and maintenance.

11) Plant for the melting of primary and secondary aluminium with screening and recovery of the slag, as claimed in precedents claims, characterized in that the process
15 of melting consists in the following phases:

a) in case of favourite melting of secondary aluminium, is realized the selection and mixing of different types of aluminium scraps, whose chemical composition has to be as close as possible to that of the desired alloy;

b) the aluminium scraps are placed, through the loading porthole (2), in melting in the
20 rotating furnace without addition of sodium chloride as cover agent to prevent the oxidation of the metal;

c) because of the rotation of the furnace and the special inside conformation, is obtained an action of mechanical remixing of the scrap in fusion, joined to an action of dragging by the walls of the same furnace;

- d) the metal gradually melts and the liquid aluminium begins to rotate in the same sense of rotation of the furnace; it will always be positioned in the low part of the furnace, because the force of gravity is higher than the drag force due to the rotation;
- e) the rotational movement, in association with the inside inclination of the furnace, will provides that the liquid metal continually flow toward the drawing hole (4) that is set in the lowest point, passing through the small channels (12) transversals to the spires of the body (11);
- f) the liquid metal is protected against the oxidation, because it is very lower than the stream of the warm gases and because it continually flow in the storage basin (16) through the channel of pouring (13);
- g) the slag remains in the tall part, and is held by the spiral body (11) and discharged close to the loading porthole; from there it reaches a channel equipped with a cochlea, that pushes them until the extremity (18) of the module of selection;
- h) the slag are shared, according to dimension and weight, in inert and ferrous material (having an high point of fusion), in aluminium oxides and dusts and introduced, automatically, in the respective channels, equipped with a cochlea; from there it flows into the store buckets;
- i) the recovered aluminium oxide is recycled to integrate the feeding charge of fusion.
- 12) Plant for the melting of primary and secondary aluminium with screening and recovery of the slags , as claimed in claim 1, characterized in that the warm gases that originate from the furnace of melting, at a maximum temperature of 300°C, are carried through the pipeline (32) in the underground pit (33).
- 13) Plant for the melting of primary and secondary aluminium, with screening and recovery of the slags , as claimed in claims 1 and 12, characterized in that the gases escape exclusively from the furnace of melting because of the concomitant effect of the

kinetic energy due to their heat, of the expansion that they have reaching the pit (33), of the loss of pressure produced by the chimney (35) and of the dragging produced by the air flow, having an high speed, that escapes from the extremity (36) of the pipeline (37).

5 14) Plant for the melting of primary and secondary aluminium with screening and recovery of the slags , as claimed in claim 1, characterized in that the exhaust gases that escape from the modules of selection and recovery of the slag and from the store basin, having a low temperature, are carried to the pipeline (37) by extractors, to continue then in an underground pipeline (38) up to the chimney (35).

10 15) Plant for the melting of primary and secondary aluminium, with screening and recovery of the slags , as claimed in claims 1, 12, 13 and 14, characterized in that both the pipelines (32) and (37) are equipped with a control valve for the automatic passage of the gases.

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